

NEW AUSTRALIAN POLYPLACOPHORA, AND NOTES ON THE
DISTRIBUTION OF CERTAIN SPECIES.

By A. F. BASSET HULL.

(Plates xxiv.-xxvi.)

Part I.

Since the publication of a paper containing descriptions of new and notes on other Australian *Polyplacophora* (1): I have carried out a fairly comprehensive examination of the shores of Port Jackson and the coast northward to Broken Bay and southward to Port Hacking. Several new species have been discovered, and a considerable amount of information has been gathered as to the distribution of some of the rarer species. On most of my excursions I was accompanied by enthusiastic friends, to whose assistance I am much indebted.

South of Port Hacking my researches have extended to the Illawarra district, including Thirroul, Austinmer, Bulli, Wollongong, and Shellharbour, at which last-mentioned place I have had valuable help from Mr. G. McAndrew, who has followed up my initial examination with an exhaustive search, resulting in the accumulation of a magnificent series of rare species.

Further south on the New South Wales coast I have collected at Bateman's Bay and Montague Island, while to the north of Sydney I have examined Port Stephens, Broughton Island, Forster, Port Macquarie, and Coff's Harbour.

In July, 1921, I went direct by steamer to Rockhampton, Queensland; collected at Emu Park, the nearest suitable locality in Keppel Bay; and proceeded thence to Gladstone (Port Curtis), Facing Island, Bundaberg, and Caloundra, a point on the mainland immediately north of Brisbane Island. In August, 1922, I revisited Caloundra, and extended my researches northward to Point Cartwright, Alexandra Headland, and Noosa Head.

During November and December, 1921, I visited Albany, Western Australia, collecting in Queen Charlotte Sound and King George Sound. From thence I visited Bremer Bay, Hopetoun, Esperance Bay, Lucky Bay, and several islands of the Archipelago of the Recherche.

Lastly, in December, 1922, I visited King Island in Bass Strait.

For valuable assistance and companionship on many of my excursions my acknowledgments are due and gratefully accorded to Mr. and Miss Foote, Buderim, Queensland; Messrs. H. S. Grant, J. H. Wright, W. Barnes, A. Livingstone, E. L. Troughton, and F. MacNeil, of the Australian Museum staff, G. and R. Lewers, and J. Webb. Mr. Charles Hedley, of the Australian Museum, to whose kindly encouragement and valuable advice I owe much, also accompanied me on numerous occasions.

The principal results of the above excursions are set out in this paper, and I have added notes relative to shells collected for me by Mr. Percy Hazell, of H.M.S. *Fantome*, at Pender Bay, N.W. Australia, Mr. S. W. Jackson, at Foul Bay, S.W. Australia; Mr. H. L. White, of Belltrees, N.S.W., at Thursday

(1) Hedley and Hull, Rec. Aust. Mus., 1909

Island; and Professor Harvey Johnston at Caloundra and Redcliffe, Queensland.

Owing to the immense extent of country covered by myself and my collecting friends, embracing points on the whole continent of Australia from Torres Strait to Bass Strait, and from the extreme east to the furthest west, but leaving great gaps of the coast untouched, these notes are necessarily disconnected to a degree. As my own journeys have aggregated over 10,000 miles, out from Sydney and return, and my correspondents have unitedly covered an even greater distance, it will be seen that the field has been a large one, embracing the tropical, semi-tropical and temperate zones. Nevertheless, I venture to place the results in one paper, relying on the limited scope of the investigations, relating as they do to the one Molluscan group, to justify my action.

The types of the new species described in this paper are in the Australian Museum, Sydney.

The plate figures were drawn by Miss Phyllis Clarke (Mrs. Arthur North).

PARACHITON PUPPIS, n.sp.

Plate xxiv., figs. 1-5.

Shell large for the genus, elongated, moderately elevated, dorsally rounded. Colour when alive, chalky white, which becomes stained to a pale buff when dried with the animal intact. The sculpture is uniformly grain-striate. Posterior valve abnormally large.

Anterior valve densely radially grained, upwards of 100 of the minutely grained striae may be counted at the anterior margin.

Median valves moderately broad, with straight posterior edge, frequently showing irregularity of outline owing to injury, and with a forward curve at the sutures. Lateral areas distinctly raised, radially striate, crossed by 3 or 4 deep growth lines; central areas longitudinally grain-striate, the granules larger than those on the lateral areas.

Posterior valve disproportionately large, with mucro prominent and projecting posteriorly. The central area regularly longitudinally sculptured; the posterior area radially striate.

Girdle densely clothed with small, very elongated, pointed scales; not marginally spiculose.

Interior pearly white; sutural plates rounded; sinus very broad and shallow, the projecting ends of the grain-striae of the tegmentum imparting a finely pectinated appearance to the jugal sinus.

Dimensions: 12 x 5½ mm. (dried).

Station: Under stones in sand or mud below low water mark.

Habitat: Bottle and Glass Point, Vacluse, Port Jackson, N.S.W.

Remarks: The first example of this interesting shell was taken by me, in company with Mr. Charles Hedley, on 15th February, 1919. It was badly crushed, a fracture extending along the jugal tract and affecting all the median valves. On 13th January, 1922, Mr. Gerald Lewers was collecting with me near the spot where the first shell was taken, and he found a second specimen which became similarly fractured owing to the pressure in tying it down on the collecting slip. Again, later in the same year, Mr. W. Barnes, collecting with me, found a third specimen almost on the same spot as the second. The animal was very large, soft, and distended with water; the foot extending laterally beyond the shell on both sides. When dried, the body contracts forward, leaving the gill rows distinctly arranged in the posterior cavity. Extreme care was taken in preserving this specimen which dried gradually, made a perfect specimen and forms the type figured. Mr. Barnes has since taken three more specimens in the same locality, one of which has been disarticulated and placed with the type shell.

Another is larger than the type, being 10 x 8 mm. This shell differs from any other member of the genus in its extraordinarily long posterior valve, the shape of which, in its resemblance to the stern of a cruiser, suggested the specific name.

TERENOCHITON ERRATUS, n.sp.

Plate xxiv., figs. 6-9.

Shell small, elongate, delicate, low, rounded. Colour rosy-pink when alive, becoming dull white in dried specimens.

Anterior valve very densely covered with minute grains arranged radially in about 100 rows.

Median valves: lateral areas differentiated by the direction of the radial rows of grains, of which there are six principal rows splitting into twenty at the margin. Central areas with about twenty longitudinal rows of similar grains on each side, rather more widely spaced, and diverging outwardly towards the margin.

Posterior valve normal size for the genus; the mucro behind the centre, the posterior area concave, similarly ribbed to the anterior valve; pleural areas as in the median valves.

Girdle densely covered with small ovate scales; margin spiculose.

Interior white; sutural laminae small, angulate, distant.

Dimensions: 5 x 3 mm.

Station: On the under side of stones in deep water (below low water mark).

Habitat: Rabbit or Mistaken Island, King George Sound, Western Australia.

Material: Seven specimens.

Remarks: This shell differs from *Terenochiton* (*Lepidopleurus*) *badius* Hedley and Hull and *matthewsonianus* in the disposition of the radial grain rows. Larger examples than the type were taken, up to 10 mm. in length; but, owing to their extremely fragile nature, they became longitudinally split.

TERENOCHITON BADIUS.

Lepidopleurus badius Hedley and Hull, Rec. Aust. Mus., 1909, p. 260.

I took several examples of this species at Point Cartwright, Queensland, a considerable northward extension of its range.

ISCHNOCHITON LUTICOLENS, n.sp.

Plate xxiv., figs. 10-13.

Shell small, elongated oval, not carinated. Colour buff or pale brown, sometimes stained with blackish-brown.

Anterior valve densely covered with minute granules, not arranged in any definite pattern.

Median valves with moderately raised, rounded lateral areas, covered with elongated oval granules diverging outwardly; central areas with granules diverging inwardly, rather larger and more clearly defined than those on the lateral areas.

Posterior valve with granules as on the anterior valve, but tending to radiate, central areas similar to the median valves; mucro in front of the middle; the posterior portion concave.

Girdle densely clothed with minute striated scales.

Interior white. Anterior valve with 15, median valves 1, and posterior valve with 13 slits.

Dimensions: 11 x 6 mm.

Station: On the under side of small stones embedded in mud, below low water mark.

Habitat: Port Curtis (Barney Point), Queensland.

Remarks: This shell was found in considerable numbers in a locality that did not at first sight appear very promising. A stretch of mangrove-fringed, sandy shore is broken by Barney Point, a low headland having a stony beach. Along the coast to and fro are many loose stones embedded in the characteristic mud of the mangrove swamps. On the under sides or at the edge of these stones of diverse sizes this shell was found associated with *L. orbiculus* Reeve. The only other species found on Barney Point was the common Port Curtis shell *Placostrophia curvicauda* Smith, which occupied the surface of a few larger stones above low water mark.

ISCHNOCHITON EXAMINANDUS, n.sp.

Plate xxv., figs. 1-4.

Shell rather small for the genus; broad, moderately elevated, carinated, side-apertured. Colour: Shell covered with a reticulated pattern in dull pink, the interspaces brownish-pink mottlings. Scales scattered irregularly over the anterior portion of the central area, and (in some valves) on the jugum, are blotches of yellowish, irregularly edged with dark greenish; the whole having a distinctive marbled pattern of pink and green. The whole shell is rather coarsely granulose, the granules being low, flattened and polished.

Anterior valve with obsolete radiation; the lines tending to undulate towards the margin.

Lateral valves: Lateral areas faintly radially ribbed, two ribs, splitting to the margin, one to each the margin, traversed by longitudinal undulating growth lines. Lateral areas with granulations arranged in quincunx, having lines radiating from the centre.

Posterior valve: Micro in front of the middle; areas similar to those of the lateral and median valves; slightly concave posteriorly.

Surface: Shell densely clothed with very minute, flat, regularly striate scales; the colour mottled pink and yellowish.

Slits: 10—1—10.

Dimensions: 14 x 8 mm.

Station: On dead shell of *Tarbo siamensis*, in rock pool, at low tide.

Locality: Long Reef, near Manly, New South Wales.

Remarks: The figures (1-3) show colour pattern, the sculpture being inconspicuous. The type shell was taken by me in company with Dr. Torr, who also took one specimen, rather badly fractured. Dr. Torr's specimen was similar in colour to the type, except that the dark greenish blotches were less marked. The radial lines on the lateral areas were more distinct; the anterior valve was similar, but the posterior valve showed numerous fine radial ribs. I have since taken several more examples in Port Jackson; Barnes has taken nine examples at the Buttle and Glass (Vancluse), and McAndrew has taken two or more at Shellharbour. A closely allied shell from southern Queensland is next described.

ISCHNOCHITON EXAMINANDUS LAETIOR, n.sub.sp.

Plate xxiv., figs. 14-17.

At Caloundra and Point Cartwright, Queensland. I collected a fine series of shells somewhat similar to the preceding species, showing a wide variation in colouration, some being typical pink-and-green marbled specimens, while others

ranged from ochraceous to deep pink, and several were decorated with a broad white dorsal stripe varying in breadth. The shell resembled somewhat after the manner of the common colour pattern of *I. proteus* Reeve.

The sculpture in all, even the smallest, of the Queensland shells, is more marked than that of the Long Reef (N.S.W.) shell. The station is below low water mark, or in deep pools and crevices in the rock; it is always on the under side or at the edge of insertion of small stones in clean sand.

This is the shell which has been recorded from Queensland as *I. crispus* Reeve by Iredale and Ashby. It can be easily separated from that species by the smaller girdle scales and generally greater breadth.

CALLISTOCHITON GRANIFER, n.sp.

Plate xxv., figs. 5-8.

Shell small, broad, not carinated. Colour buff, with a few scattered chocolate spots. The sculpture generally consists of coarse granules, mostly uniform in size, but very irregularly arranged, and becoming slightly larger towards the periphery.

Anterior valve with 15 radiating folds, with very narrow interstices, becoming obsolete posteriorly. Apex emarginate.

Median valves: Lateral areas distinctly differentiated; two submarginal rapidly increasing, elevated radial ribs, irregularly granose, their own breadth apart; the posterior shelf has the granules more regularly longitudinally arranged. Central areas with irregular rows of granules, crowding, and becoming smaller towards the jugum.

Posterior valve: Mucro elevated, central, posterior half with 12-13 folds corresponding to those of the anterior valve; anterior half with granules radially disposed, sharper and more regularly arranged than those in the central areas of the median valves.

Girdle densely clothed with uniform fluted scales.

Dimensions: 9 x 5½ mm. (dried and somewhat curled).

Habitat: Palm Island, Queensland.

Station: Dredged in 15 fathoms.

Material: One adult specimen.

This shell was obtained by Mr. Charles Hedley, of the Australian Museum. It differs from all other species of the same genus in the peculiarly separated character of the granules which form the sculpture.

CALLISTOCHITON ANTIQUUS.

Chiton antiquus Reeve, Conch. Icon., 1847, t. 25, f. 169.

Ashby has been investigating the Australian species of this genus, and has described two new subspecies from South Australia and Tasmania respectively. (Trans. Roy. Soc. S. Aust., 1919, p. 400). The addition of *C. granifer* and the accumulation of specimens from other parts of Queensland and Western Australia lead me to consider that this genus requires very careful study. Iredale now informs me that Reeve's type is the common Port Jackson shell, and that the shell described by Smith from Port Molle is distinct. [*Chiton* (*Callistochiton*) *antiquus* Smith, Rep. Zool. Coll. *Alert.*, 1884, p. 79.] For the present I content myself with mentioning that examples from Shellharbour, New South Wales, are of unusual dimensions. Reeve's type is stated to be 17 x 10 mm. One from Shellharbour in my possession, taken by McAndrew, is 33 x 17 mm.

GENUS RHYSSOPLAX, Thiele.

In "The Chitons of the Kermadec Islands," (Proc. Mal. Soc., vol. xi., pt. 1, 1914, p. 39), Iredale gives his reasons for adopting Thiele's name *Rhyssoplax* (1909) for certain Australasian shells previously assigned to the genus *Chiton* Linne (1758). He says: "Whether the species is heavily sculptured like *Ch. canaliculatus* Quoy and Gaimard, and *Ch. vauculusensis* Hedley and Hull, or practically smooth, as *Ch. translucens* Hedley and Hull, the internal structure is exactly comparable." On p. 40 he says: "As noted previously, species referable to the genus *Rhyssoplax* vary from very heavily sculptured forms to absolutely smooth species. I examined a series of *Chiton aereus* Reeve, and found that the most juvenile specimens were unsculptured, then the sulcations on the pleural areas appeared before the lateral radial ribbing was formed. This implies that the primitive form was unsculptured, and the sculptured forms are more recent. It is most interesting from this point of view to study the Australasian *Rhyssoplax* when we find this primitive form surviving unchanged in the species *Chiton translucens* Hedley and Hull. The next stage is well known by means of *Ch. jugosus* Gould, *Ch. coxi* Pilsbry, etc., and the third stage by such species as the succeeding one (*Rhyssoplax erasperata* Iredale) and *Ch. aereus* Reeve. A further development of stronger and more pronounced sculpture still is seen in *Ch. canaliculatus* Quoy and Gaimard, and *C. vauculusensis* Hedley and Hull."

Chiton vauculusensis and *C. translucens* were described by Hedley and myself in 1909, the types being taken in the same locality. Subsequent experience has shown that these two species, representing the most primitive and most highly developed stages of the genus, are almost always found in company, and in very limited areas.

RHYSSOPLAX TRANSLUCENS.

Chiton translucens Hedley and Hull, Rec. Aust. Mus., vol. vii., No. 4, 1909, p. 263.

The curious fact that this species was first taken in 1864, but remained unnamed until 45 years later is related in our original description. Its occurrence at Caloundra, Queensland, was also noted. Since 1909 I have taken specimens at Green Point on the eastern side of Watson's Bay, at Obelisk Bay, Port Jackson, almost opposite to the type locality (Bottle and Glass Point), on the coast exposed to the full force of the Pacific rollers at Deewhy Head, north of Sydney Heads, at Shellharbour, New South Wales, and at both Caloundra and Point Cartwright, Queensland. Mr. W. Barnes has taken a number at Green Point, one of which measured 55 mm. in length, as compared with 38 mm., the length of the type. One of the specimens I took at Point Cartwright was 53 mm., but it was damaged, valves 2 to 8 being broken along the jugum, probably by a boulder rolling in the surf. The numerous specimens thus taken show considerable variation in shade and disposition of the colour and markings, but the general pale olive and buff of the type are constant. Some of the juvenile shells show some brilliant red markings, and the whole range of specimens collected displays the remarkable clean, polished surface attributed to the type.

RHYSSOPLAX VAUCLOSENSIS.

Plate xxv., figs. 9-12.

Chiton vauculusensis Hedley and Hull, Rec. Aust. Mus., vol. vii., No. 4, 1909, p. 261.

The type specimens of *R. vauculusensis* were taken by me in from 4 to 5 feet of water at low tide, in the year 1908. One specimen was 33 mm. in length, and was preserved intact as the type; the other being considerably smaller was dis-

articulated for examination of the interior characters. The sculpture of the smaller specimen was much less marked than that of the larger. Although many visits were paid to the type locality (Bottle and Glass Point, Vacluse, Port Jackson) during the succeeding 14 years, no further examples of the species were discovered until 13th January, 1922, when Mr. Gerald Lewers, collecting in my company, found two beautiful specimens, the larger of which was 34 mm. in length. During the latter part of 1922 and early in this year, Mr. W. Barnes has taken three or four more specimens, all in the same very restricted locality.

In July, 1921, I visited Caloundra, and took two shells, 21 and 23 mm. in length respectively. The sculpture of these two shells was finer and the surface of the tegumentum so much more highly polished than the smaller of the type specimens of *R. vaclusensis* that I was inclined to assign subspecific or varietal rank to these Queensland examples. However, on again visiting Caloundra and Point Cartwright, 10 miles further north, in August, 1922, I secured a splendid series of shells, ranging from 6 to 36 mm. in length, showing the gradual development of the sculpture, and differing only in the more uniform nature of the colouring from the largest of the Port Jackson examples. This series illustrates in a marked degree the accuracy of Iredale's description of the development of typical species of the genus *Rhyssoplax*, as exemplified by his examination of a series of *R. aereus* Reeve. In the smallest shell the lateral areas are practically smooth, there being only the appearance of a broad shallow depression widening towards the sutural margin, but the central areas show distinctly the commencement of the transverse sulcations so marked in the adult, the shallow pits appearing anteriorly, just behind the margins of the anterior valve; while the ridges are indicated by lines of darker brown colour extending almost across the areas. In a specimen measuring 13 mm. the sulci and ridges of the central areas have become as clearly defined, and extend right across the areas, as in the adult, while the lateral areas merely show the depression a little more accentuated. In a specimen measuring 21 mm. the two outer margins of the lateral areas have become raised and developed into distinct ridges, showing a tendency to bifurcate distally, and the depression is now occupied by a distinct riblet. As the shells increase in size the riblets on the lateral areas split up until they reach the maximum number of 5 with an occasional sixth on the second valve. Amongst the shells taken at Caloundra were two exquisite ivory-white examples, both found on the one stone, one on the upper and one on the under side. The only colour on these shells consists of one or two small spots of rich sienna on the posterior margin of valves 1 to 7, and one spot on each side of the mucro on the posterior valve. Examination of typical coloured specimens shows that spots of a darker brown exist in corresponding positions in all cases.

Towards the end of 1922 Mr. G. McAndrew discovered a fine specimen of *R. vaclusensis* at Shellharbour, about 50 miles south of Port Jackson. This was a typical shell in all respects. He has since taken about 14 specimens, all adult, ranging from 28 to 41 mm. in length. This series shows greater diversity in colour-markings than the Port Jackson series, some showing longitudinal bands of whitish throughout or on each side of the jugum. One magnificent shell, 41 x 21 mm. is creamy white with the exception of the darker or blackish-brown spots in the same positions as on the Queensland albinos, and with a series of blackish-brown spots arranged in triangles with bases anteriorly on the central areas. These triangular clusters of spots are characteristic of the usual coloured shells.

The fine series of this shell, previously so rare, taken during the past two years, and resulting in an extension of its recorded range over a coast line of approximately 600 miles, has afforded me the keenest satisfaction, and incidentally enabled me to fill a long felt want in the cabinets of some of my friends. All

the circumstances attending the collecting of the series go to prove that it is very restricted in occurrence, being found in each case within very limited areas of only a few square yards in extent. It appears to be a deep water species, i.e., it is not found above low water mark; and it prefers a position on the under side or below the margin of insertion of small stones embedded in sand or even (as at Shellharbour) in mud.

RHYSSOPLAX CARNOSUS.

- Chiton muricatus* A. Adams, P.Z.S., 1852, p. 91, t. 16, f. 6.
Lophyrus muricatus Angas, P.Z.S., 1865, p. 186, 1867, p. 222.
Chiton carnosus. } (Carpenter MSS) Angas, P.Z.S., 1867, p. 222.
Chiton limans. }
Chiton limans. } Pilsbry (Carpenter MSS), described.
Chiton aurantius. } Man. Conch., 1892, p. 176.
Chiton carnosus. }
Chiton limans Sykes, Proc. Mal. Soc., 1896, p. 93 (*nom. nov.* for *C. muricatus* Adams).
Rhyssoplax limans Iredale, Proc. Mal. Soc., 1914, p. 41.
Rhyssoplax jacksonensis Ashby, Trans. Roy. Soc. Vic., 1920, p. 153.

This species was named *Chiton muricatus* by Adams. Carpenter applied the names *carnosus* and *limans* to shells of this species, both from Sydney, but did not publish the descriptions. These names were quoted by Angas in his paper on the Port Jackson shells over fifty years ago. Twenty-five years later Pilsbry published Carpenter's MSS descriptions in connection with *C. muricatus* Adams, and reversed the order of the names. He also added Carpenter's description of the variety *aurantius*. A few years later Sykes, noting that Adams's name *muricatus* was preoccupied (Tilesius, Mem. Acad. Sci. St. Petersburg, 1824, p. 483) proposed to rename the Port Jackson shell *limans* (from Carpenter's MSS) as of himself. He, however, was dealing with a Victorian shell (*vide* Ashby, *loc. cit.*) which turned out to be *Chiton tricostalis* Pilsbry. I have since seen the shell in question (National Museum, Melbourne) and can confirm Ashby's identification. Ashby then renamed the Port Jackson shell *jacksonensis*, but this was superfluous in view of the three prior names available. Under the present International Rules of Nomenclature names published in synonymy are valid, and therefore *carnosus* must stand for the Port Jackson shell. Even if this were not admitted, *limans* of Pilsbry is anterior to *limans* of Sykes, it was given to the Port Jackson shell, and should therefore take precedence over the latter.

Examination of a large series of this shell proves that Carpenter's three descriptions fit the Port Jackson shell in one or other of its stages of growth or variations in colour. It has been my good fortune to examine several hundreds of examples taken within Port Jackson, from the ocean beaches on either side of the Heads, from Port Stephens (90 miles north of Sydney) and from Shellharbour (50 miles south of Sydney). The colour is extremely variable, and, while a dull olive green or a dark brown are the predominating shades, these are frequently relieved by the picking out of some valve with a bright contrasting colour such as purple, red, or pale green. Two brilliant shells from Shellharbour would admirably answer to Carpenter's *carnosus* and *aurantius*, being blood-red and golden-orange respectively.

The dimensions of Carpenter's shells ranged from $17\frac{1}{2} \times 10$ mm. to 30×15 mm. My largest Port Jackson shell measures 26×16 mm., and from Shellharbour, where the species seems to attain its greatest development, I have a perfect example, $33 \times 18\frac{1}{2}$ mm.

As pointed out by Iredale this species represents the most highly specialised form of the genus *Rhyssoplax*. I think it is entitled to a section, in view of the remarkable girdle scales.

RHYSSOPLAX PARTICOLOR, n.sp.

Plate xxvi., figs. 5-8.

Shell elevated, carinated, side-slopes convex. Surface smooth with a fine reticulated pattern covering the whole shell. Colour, lilac-rose, mottled with darker; some median valves partly yellowish; the girdle lilac-rose, with four yellow bands in opposing pairs at the sutures of the anterior and posterior valves respectively.

Anterior valve having about 12 indistinct indications of nodulose ribs, the nodules being more pronounced at the front and back margins; apex smooth.

Median valves: Lateral areas composed of two ribs enclosing a groove, the anterior rib having five indistinct nodules, the posterior margin with about five unguulate nodules, causing undulation of the margin; central areas having seven to eight narrow sulci, decreasing towards the jugum, only four extending right across the area.

Posterior valve with mucro prominent, in front of the centre, posteriorly concave; the radial riblets as in the anterior valve showing more pronounced nodules at the margins only; central areas as in the median valves.

Girdle scales small, pointed, regularly striate.

Interior white.

Dimensions: 13 x 7 mm.

Station: On the under side of a stone in a sheltered pool below low water mark.

Habitat: Caloundra, Queensland.

Remarks: Since the above description was written and the figures drawn, I have collected a fairly large series at the type locality, and also at Point Cartwright, about fifteen miles further north. This series shows a remarkable colour variation; dull green, brown, rose, canary-yellow, and variegated examples being taken. In size they range up to 22 x 13½ mm. The type is not fully developed, the pustulose ribs on the end valves becoming more definite and pronounced as age advances, and the sculpture of the lateral areas of the median valves shows progression in the splitting of the ribs up to four, with a maximum of sixteen nodules to a rib, with a tendency to coalesce. Girdle scales become more pointed, but do not present the striking mucronation of *R. carnosus* (*limans*), with which it has hitherto been confused, being recorded from Queensland under this name by Iredale. The sculpture of *R. particolor*, as a matter of fact, more closely approaches that of *R. tricostalis* Pilsbry from South Australia, than that of *R. carnosus* Augas from New South Wales. Typical examples of the latter species have not yet been found in Queensland.

RHYSSOPLAX VENUSTA, n.sp.

Plate xxvi., figs. 1-4, 9-12.

Shell elevated, carinated, side-slopes slightly convex, surface smooth and rather polished, with a fine reticulated pattern covering the whole shell. Colour apple-green, except valves iv. and v., which are pompeian red; the girdle yellow, except opposite valves iv. and v., where it is brick-red, and there are a few irregular splashes of brick-red appearing on the yellow portion. The colour of the whole shell consists of minute spots or freckles.

Anterior valve with 20 low radiating riblets, composed of large round, flattened pustules, 3 or 4 to each rib; the apex smooth.

Median valves: Lateral areas strongly raised, valve ii. with two grooves, the others with one groove, the raised ribs composed of 5 or 6 low flattened pustules increasing in size towards the margin; central areas with 7 to 10 narrow sulci extending right across the area, the intervening broad rounded ribs not being distinguished by any difference in colour.

Posterior valve with prominent nmero in front of the centre; 13 radiating riblets with oval or laterally compressed pustules, less clearly defined than those on the anterior valve; the central areas having each 6 shallow sulci, more uniform and less clearly defined than those on the median valves.

Juvenile form (Plate xxvi., figs. 9-12).

Shell elevated, carinated, side-slopes slightly convex; surface smooth, highly polished, finely reticulated.

Colour, variable, pale brown sometimes mottled with olivaceons.

Anterior valve smooth, save for a growth line near the front margin, and faint indications of about 7 very broad and shallow grooves.

Median valves beaked, having distinctly raised lateral areas with a shallow obsolescent groove and 3 to 4 low pustules on the raised portions; central areas with 2 to 4 sulci extending across the area, more indicated by colour than depth.

Posterior valve: Mucro prominent, in front of the centre; 7 or 8 low pustules regularly arranged along the posterior margin, suggesting the termination of obsolete riblets; 3 fine dark lines or sulci in each central area.

Girdle scales uniform, oval, flattened, smooth anteriorly, striated posteriorly.

Interior white. Slits 8—1—11.

Dimensions: 12 x 7 mm.; juvenile, 8½ x 5 mm.

Station: On the under side of a small stone in a sheltered pool above low water mark.

Habitat: Emu Park, Keppel Bay, Queensland.

Affinities: This shell suggests *Rhyssoplax carnosus* Angas, in the juvenile stage, but the girdle scales are not mucronated.

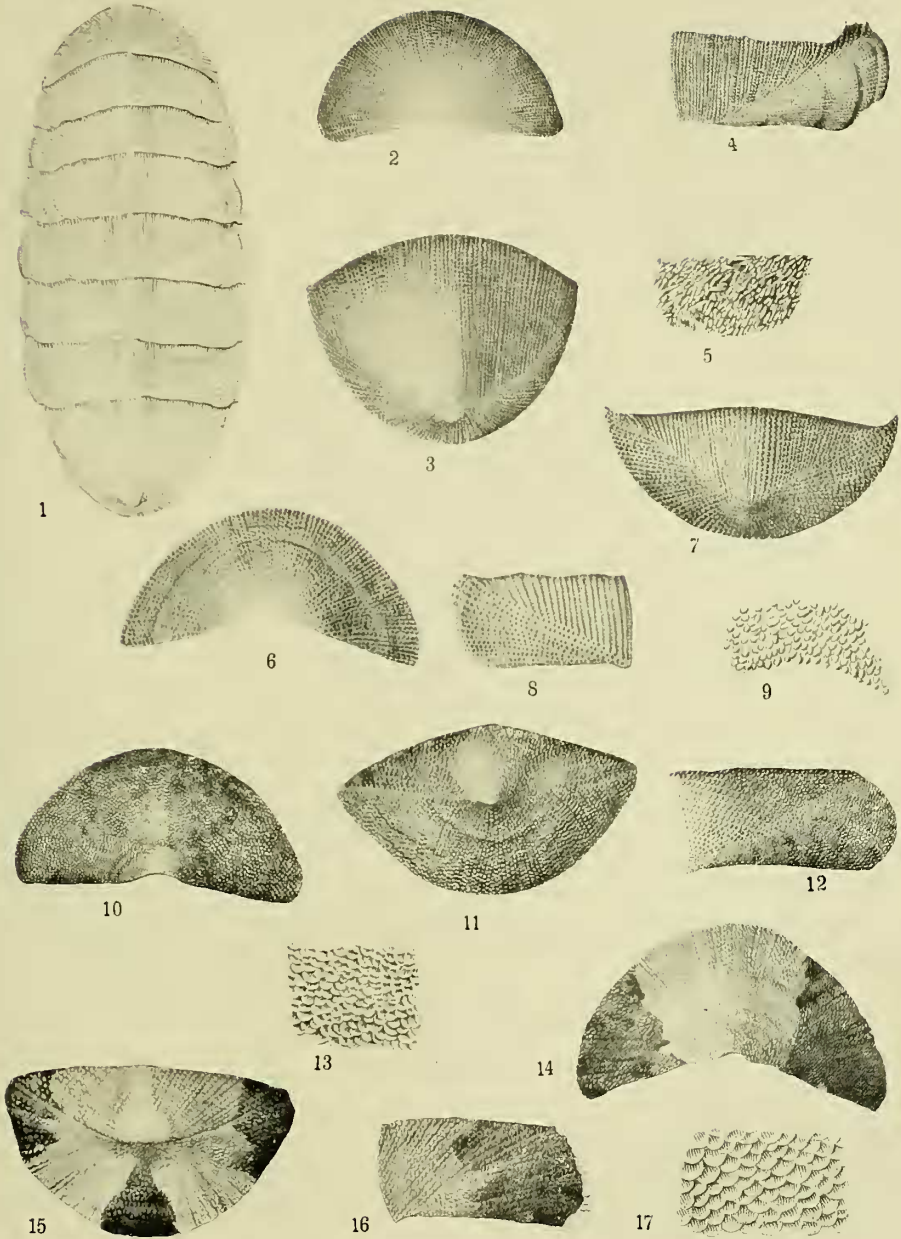
Material: One adult (?) and two juvenile, of similar dimensions, but varying colour.

Remarks: This probably represents a deep water species, attaining considerable proportions when fully adult.

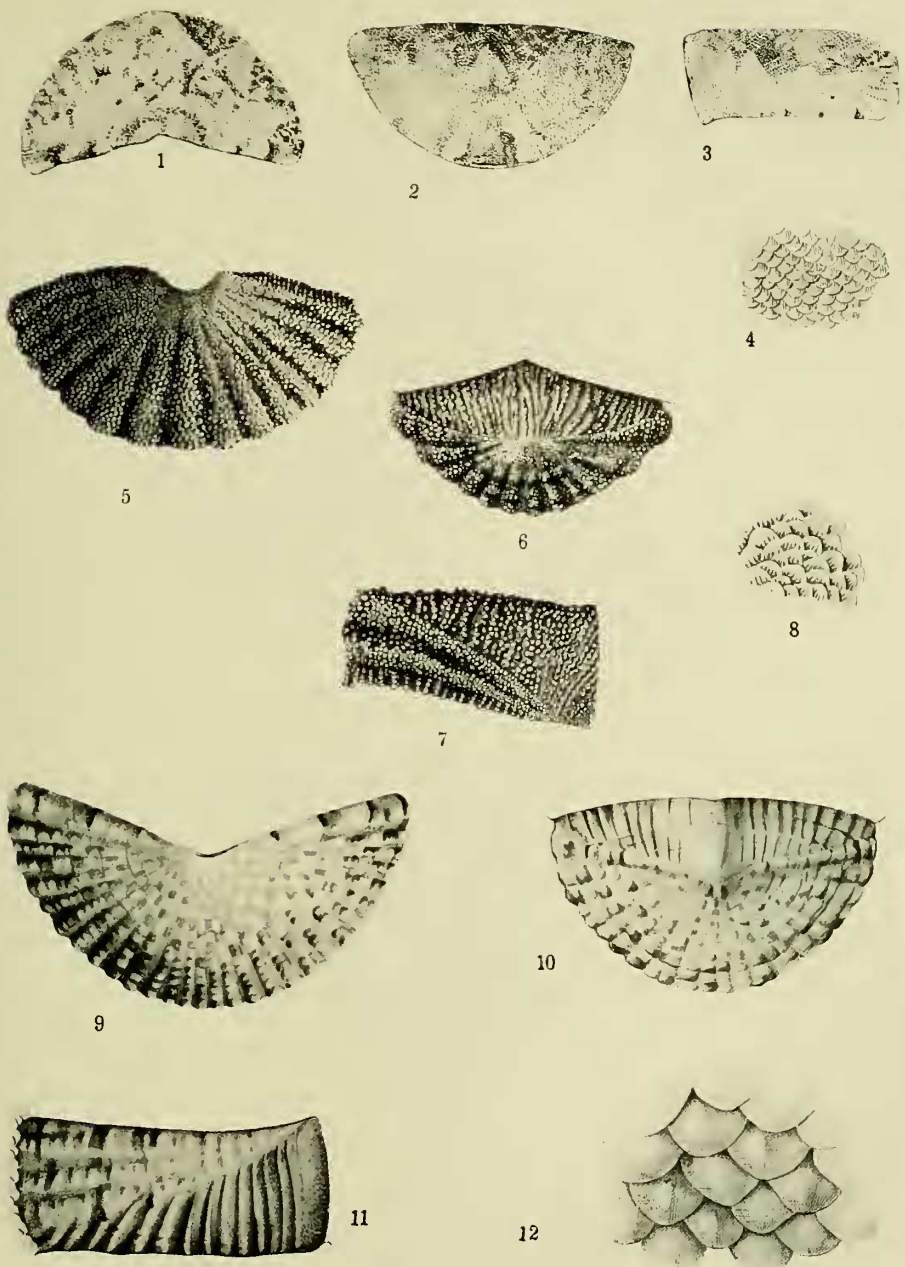
EXPLANATION OF PLATES.

Plate xxiv. illustrates the whole shell of *Parachiton puppis* (fig. 1), the anterior valve (fig. 2), one-half of a median valve (fig. 4), the posterior valve (fig. 3), and a section of the girdle (fig. 5). *Terenochiton erratus*, *Ischnochiton luticolens*, and *Ischnochiton examinandus lactior* are represented by enlarged figures of the anterior valve, posterior valve, one-half of a median valve, and a section of the girdle respectively in the order given.

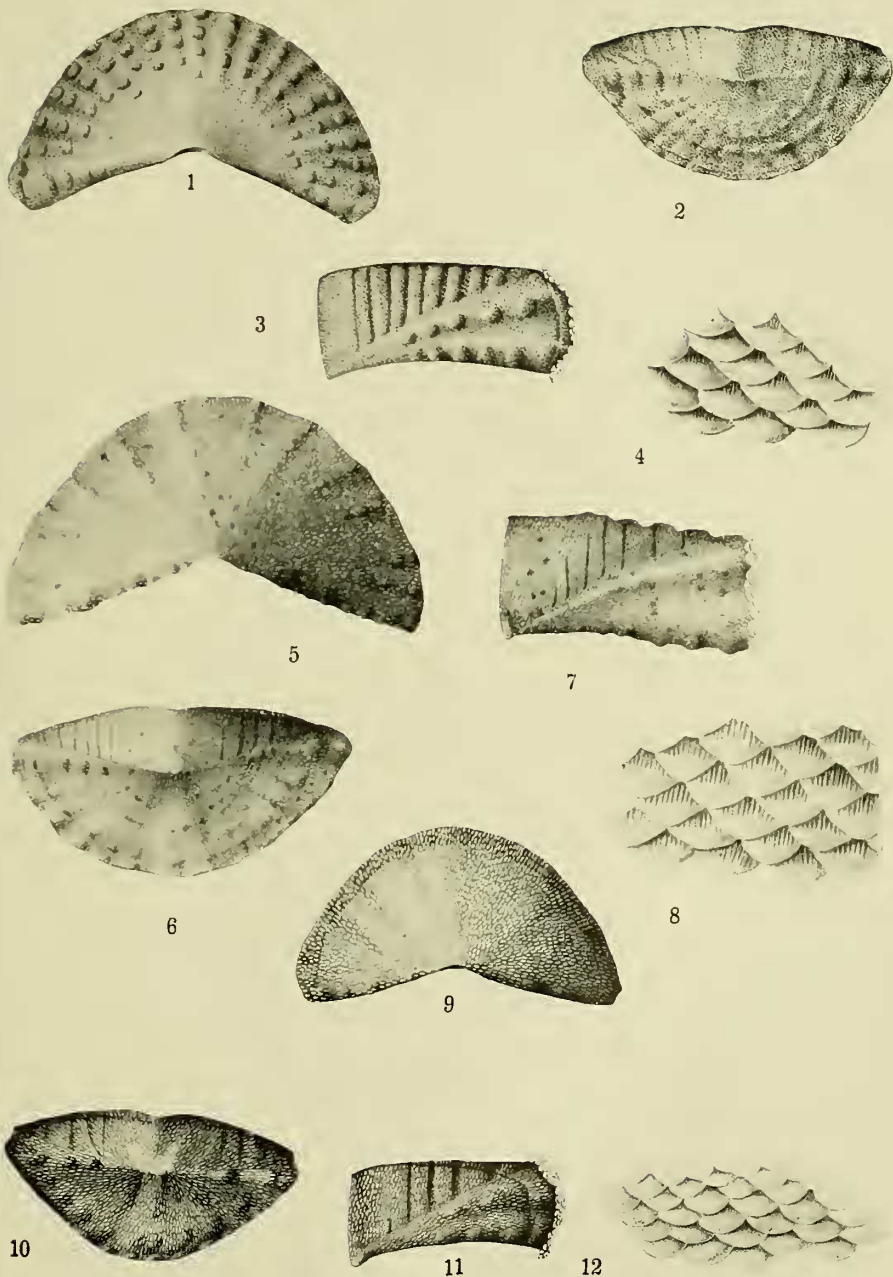
Plates xxv. and xxvi. illustrate the same four parts of the following species: *Ischnochiton examinandus*, *Callistochiton granifer* and *Rhyssoplax vaucclusensis* (Plate xxv.), and *Rhyssoplax venusta* (2 forms) and *R. particolor* (Plate xxvi.).



Figs. 1-5 *Parachiton puppis*, n.sp.
 .. 6-9 *Terenochiton erratus*, n.sp.
 .. 10-13 *Ischnochiton luticolens*, n.sp.
 .. 14-17 *Ischnochiton examinandus lactior*, n. sub-sp.



Figs. 1-4 *Ischnochiton examinandus*, n.sp.
.. 5-8 *Callistochiton granifer*, n.sp.
.. 9-12 *Rhysoplax rauclosensis* Hedley and Hull, immature.



Figs. 1-4 *Rhyssoplax venusta*, n.sp.
 " 9-12 " " juvenile.
 " 5-8 *Rhyssoplax particolor*, n.sp.